



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
gram Name: Bachelor of Technology (Textile Engineering)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BTMA401	BS	Statistics and Quality Control	60	20	20	-	-	3	1	-	4

Course Objective

1. To provide the knowledge of statistical analysis of test data.
2. To provide knowledge of quality control chart.
3. To build up skill and ability for R and D work through statistical analysis.

Course Outcomes

After the successful completion of this course students will be able to:

1. demonstrate the knowledge for statistical analysis of test data.
2. make the quality control chart of the manufactured product.
3. identify and analyze the reason of defect through statistical analysis and use the knowledge in developing the product.
4. illustrate and discuss the sampling methods.

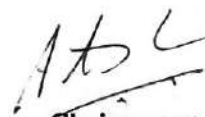
Course Content:

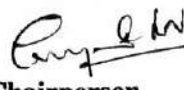
UNIT – I

Collection and presentation of data, Measures of central tendency, Measures of variation, Skewness, Moments and kurtosis, Probability Theory, priori and posteriori probabilities, conditional probabilities Bay's theorem (Simple Problems).

UNIT – II

Probability distribution: discrete distribution, binomial, and poison distributions. Continuous Normal Distribution, Exponential Distribution, central value theorem, Normal Probability curve, calculation of mean and variance From Normal Curve, Practical usefulness of normal Distribution, sampling distribution, Bivariate Distribution, Correlation and Regression, Analysis of Variance, significance of error R² (one way classification only).


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Program Name: Bachelor of Technology (Textile Engineering)

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			END SEM	MST	Q/A	END SEM	Q/A				
BTMA401	BS	Statistics and Quality Control	60	20	20	-	-	3	1	-	4

UNIT – III

Elementary theory of testing of hypothesis, Statistical Hypothesis, Null Hypothesis, Errors of first and second kind, Critical Region, level of Significance. Chi-square test of goodness of fit Test of significance based on T, F and Z distribution.

UNIT – IV


General idea of sampling method, random sample, sampling size, sample size for different distribution, differences between average and variances.


UNIT – V


Statistical quality control chart, control limits, X, R, P, Pn chart etc., analysis by defects, number of defects (C chart), introduction to TQM and ISO 9000.

References:

- Gupta, Kapoor: Fundamental of Mathematical Statistics
- Booth J.E.: Textile Testing.
- SITRA : Application of statistics in textile.
- Grover B. & Hanby D. S.: Textile testing and Quality Control. Grant Eugene; Statistical Quality control; TMH


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Department of Physics

Choice Based Credit System (CBCS)


B. Tech. (Common for All branches)

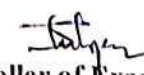
Subject Code	Category	Subject Name	Teaching and Evaluation Scheme								
			Theory			Practical		Th	T	P	CREDITS
			End Sem University Exam	Two Term Exam	Teachers Assessment *	End Sem University Exam	Teachers Assessment *				
BTPH101	DC	Applied Physics	60	20	20	30	20	3	1	2	5

Course Objectives	<ol style="list-style-type: none"> 1. To develop the comprehensive understanding of laws of physics. 2. To develop ability to apply laws of physics for various engineering applications. 3. To develop the experimental skills, ability to analyze the data obtained experimentally to reach substantiated conclusions.
Course Outcomes	<ol style="list-style-type: none"> 1. Student will be able to comprehend laws of physics. 2. Student will be able to apply laws of physics for various engineering applications. 3. Student will be able to determine physical parameter experimentally and will be able to analyze the data obtained experimentally to draw substantiate conclusions.

Abbreviation		Teacher Assessment (Theory) shall be based on following components: Quiz / Assignment/ Project / Participation in class (Given that no component shall be exceed 10 Marks).
Th	Theory	Teacher Assessment (Practical) shall be based on following components: Viva / File / Participation in Lab work (Given that no component shall be exceed 50% of Marks).
T	Tutorial	
P	Practical	


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BTPH101: Applied Physics

UNIT I: Quantum Physics

Introduction to Quantum hypothesis, Matter wave concept, Wave Group and Particle velocity and their relations, Uncertainty principle with elementary proof and applications to microscope and single slit, Compton Effect, Wave function and its physical significance, Development of time dependent and time independent Schrodinger wave equation, Applications of time independent Schrodinger wave equation.

UNIT II: Solid State Physics

Free electron model, Qualitative Analysis of Kronig Penney Model, Effective mass, Fermi level for Intrinsic and Extrinsic semiconductors, P-N junction diode, Zener diode, Tunnel diode, Photodiode, Solar-cells, Hall Effect, Introduction to Superconductivity, Meissner effect, Type I & II Superconductors.

UNIT III: Nuclear Physics

Nuclear Structure & Properties Nuclear models: Liquid drop with semi-empirical mass formula & shell model. Particle accelerators: Cyclotron, Synchrotron, Betatron. Counters and Detectors: Giger-Muller counters, Bainbridge Mass Spectrograph and Auston Mass Spectrograph.

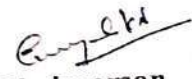
UNIT VI: Laser & Fiber Optics


Stimulated and Spontaneous Emission, Einstein's A&B Coefficients, Population Inversion, Pumping, Techniques of Pumping, Optical Resonator, Properties and Applications of Laser, Ruby, Nd:Y AG, He-Ne lasers. Introduction to Optical fibre, Acceptance angle and cone, Numerical Aperture, V-Number, Ray theory of propagation through optical fibre, Pulse dispersion, applications of optical fibre.

UNIT V: Wave Optics

Introduction to Interference, Fresnel's Bi-prism, Interference in Thin films, Newton's rings experiment, Michelson's interferometer and its application, Introduction to Diffraction and its Types, Diffraction at single slit, double slit, resolving power, Rayleigh criterion, Resolving power of grating, Concept of polarized light, Double refraction, quarter and halfwave plate, circularly & elliptically polarized light.


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BTPH101: Applied Physics

REFERENCES

1. "Engineering Physics", by Dr. S. L. Gupta and Sanjeev Gupta, Dhanpat Rai Publication, New Delhi.
2. "Engineering Physics", by Navneet Gupta, Dhanpat Rai Publication, New Delhi.
3. "Engineering Physics", by H. J Sawant, Technical Publications, Pune, Maharashtra.
4. "Engineering Physics". by MN. Avdhanulu & P. G. Kshirsagar, S. Chand & Co. Edition (2012).
5. "Fundamentals of Physics", by Halliday, Wiley, India.
6. "Concepts of Modern Physics", by Beiser, TMH, New Delhi.
7. "Atomic and Nuclear physics", by Brijlal and Subraminayan.
8. "LASERSs and Electro Optics". by Christopher C. Davis, Cambridge Univ. Press (1996).
9. "Optoelectronics an Introduction", by J Wilson & JF.B.Hawkes, "" Prentice-Hall II Edition.
10. "LASER theory and applications", by A. K. Ghatak & Tyaga raja n, TMH (1984).


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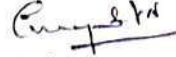
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BTPH101: Applied Physics

List of experiments

1. Measurement of radius of curvature "R" of convex lens by Newton's ring experiment.
2. Measurement of Numerical aperture of fiber by LASER.
3. Determination of Energy band gap .Eg" of Ge using Four Probe method.
4. Measurement of Frequency of A.C. mains by electrically maintained vibrating rod.
5. Measurement of Resolving Power of Telescope.
6. Measurement of "A" of LASER light source using Diffraction Grating.
7. Determination of Planck's constant by using photocell.
8. Determination of Energy band gap (Eg) using PN Junction Diode.
9. To determine the mass of cane sugar dissolved in water using half shade polarimeter.
10. To study forward and reverse characteristics of Zener diode.
11. To study forward and reverse characteristics of P-N diode.
12. To study characteristics of Photo diode.
13. To study characteristics of LDR.
14. μ and ω of given prism using spectrometer.
15. Measuring height of a given object using Sextant.


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Choice Based Credit System (CBCS) in Light of NEP-2020
B.Tech. in Textile
(2023-2027)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI508		INSTRUMENTATION AND MEASUREMENT CONTROL	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To provide knowledge on the fundamentals of measuring instruments with common types of errors.
2. To provide a knowledge on the basics of control system theory
3. To introduce different types of sensors, transducers and strain gauges ,thermocouples, thermometers and flow meters used for measurements
4. To introduce measuring equipments used for linear and angular measurements.
5. To familiarize students with surface roughness measurements on machine components

Course Outcomes (COs):

Students will be able to

1. Understand measurement techniques and use of measuring instruments
2. knowledge for dealing with problems involving control system fundamentals
3. work in Quality control and quality assurances divisions in industries
4. Design a sensors and transducers used for analysis.
5. Design measuring equipments for the various Parameters.
6. Check and measure quality in engineering products.

Syllabus

UNIT I

7 Hrs.

Basic concepts of measurements: Introduction, idea of a generalized measurement system, basic characteristics of measuring devices - accuracy, precision, error, hysteresis, resolution, threshold, repeatability, reliability, span, dynamic accuracy; calibration.

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UNIT II

7 Hrs.

Transducer: Introduction, classification, basic requirements. Displacement measurement, Transformers: LVDT, RVDT, capacitive, shaft encoders, hall effect devices proximity devices. Strain gauge: basic principle, gauge factor, types of strain gauge, materials and their properties.

UNIT III

8 Hrs.

Temperature Measurement: Temperature standards, Temperature scales, Thermometry based on thermal expansion, Liquid in glass thermometers, Bimetallic Thermometers, Electrical resistance thermometry: Resistance Temperature Detectors, Thermistors, Thermocouple.

UNIT IV

7 Hrs.

Pressure and Velocity Measurement: Relative pressure scales, pressure reference instruments, barometer, manometer, deadweight tester, pressure gauges and transducers, total and static pressure measurement in moving fluids Flow measurement: Pressure differential meters: Orifice meter, Venturi meter, Rota meter.

UNIT V

9 Hrs.

Introduction to control systems: Examples of control systems. Open loop and closed loop control. Transfer function, impulse response function, block diagram of closed loop system, and block diagram reduction, modeling of mechanical systems, modeling of electrical systems, signal flow graphs. Transient and steady state response analyses: First order systems, unit step and unit impulse response of first order systems, second order systems, unit step and unit Impulse response of second order system.

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BTEI508		INSTRUMENTATION AND MEASUREMENT CONTROL	60	20	20	30	20	3	0	2	4	

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Text Books:

1. Metrology and Instrumentation – Swahney.
2. Instrumentation Measurement and Analysis; TMH, - Nakra B C and Chaudhary K K.
3. Instrumentation for Engineers and scientist; Oxford higher Ed - Turner J D and Hill M.

References:

1. Instrumentation & Control - Rangan, Mani & Sharma.
2. Transducers & Instrumentation - Murty.
3. Control Systems Engineering - Nagrath and Gopal.
4. Modern Control Engineering; 4e Pearson Education, New Delhi - Katsuhiko Ogata.

List of Experiments:

1. Detailed study of LVDT & Measurement of distance using LVDT.
2. Learning techniques of measurement of strain using strain gauge.
3. Observe and Analysis the characteristics of NTC thermistor.
4. To observe the water level measurement
5. To analysis the Resistance Temperature Detector.
6. Learning the techniques of measurement of temperature of thermocouple.
7. Learning the techniques of measurement of pressure and characteristics of pressure transducer.
8. To observe the dead weight pressure gauge.
9. To measure the distance using ultrasonic transducer.
10. Demonstration and performance of CRO.

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Choice Based Credit System (CBCS) Scheme in light of NEP-2020
B. Tech/B.Tech+MBA in Mechanical Engineering
(2023-2027)

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME101	BEC	ENGINEERING DRAWING	60	20	20	30	20	1	0	4	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

To familiarize with concepts of (A) scale, conic sections and engineering curves (B) projections of points and line in all quadrants; (C) construction of geometrical figures & solids, with its orientation on horizontal and vertical planes, and its projection; section of solid, (D) development of solid and isometric projection view.

Course Outcomes:

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes:

1. Student would be able to draw scale, conic sections and engineering curves.
2. Student would be able to draw projection of point and line; identify the use of these concepts in practical life.
3. Students would be able to understand plain & 3D model at various orientations and draw their projection.
4. Student would be able to draw the projections of with and without sectioning of solid models and surface development.
5. Students would be able to understand the difference between orthographic view and isometric projections.

Syllabus:

UNIT I

(8 Hrs)

Scales, Conic Section & Engineering Curves Scales: Representative Factor, types of scales, principle and construction of different scales

Conic Section: Construction of ellipse, parabola and hyperbola by different methods; Normal and Tangent

Engineering Curves: Cycloid, Epicycloids, Hyper cycloid, Involute, Archimedean and Logarithmic spirals

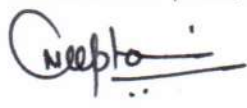
UNIT II


(9 Hrs)

Projection of Points & Line Projection: Introduction to projection, Types of projection, terminology, first angle and third angle

Projection of Points: Introduction of point, conventional representation


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BTME101	BEC	ENGINEERING DRAWING	60	20	20	30	20	1	0	4	3

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Projection of Lines: Introduction of straight line, orientation of straight line, true inclination and true length, concepts of end projectors, plan and traces and auxiliary planes.

UNIT III **(9 Hrs)**

Projections of Planes: Introduction of planes, types of planes, orientation of planes, projection of planes in different positions, traces of planes

Projection of Solids: Introduction of solids, classification of solids, recommended naming of corners of solids, orientation of solids

UNIT IV **(8 Hrs)**

Section of Solids: Introduction of section of solids, terminology, types of section planes, section of prisms, section of pyramid and section of composite solids

Development of Surfaces: Introduction of development of surfaces, classification of surfaces, methods of development, development of prisms, pyramids, cylinder and cone, anti-development

UNIT V **(7 Hrs)**


Isometric Projections: Introduction of isometric projection, terminology, isometric projections and isometric views, isometric views of planes, right solids, truncated solids and composite solids.

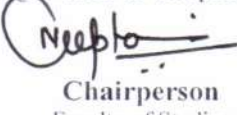
Text and Reference Books:

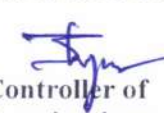
1. "Engineering Graphics" by P.I. Varghese, McGraw Hill Edu., 2012.
2. "Engineering Drawing and graphics" by K. Venugopal, New Age (I) Pub., 2004.
3. "Engineering Drawing" by N.D. Bhatt, Charotar Publishing House, 2014.
4. "Engineering Drawing" by Basant Agarwal & C.M. Agarwal, McGraw Hill Edu., 2013.
5. "Engineering Drawing" by P.S. Gill, S.K. Kataria & Sons, 2013.

List of Experiments:

1. Drawing various types of scales using representative fraction.
2. Drawing various conics section.
3. Projection of points in all quadrants.
4. Projection of straight lines in all quadrants in various orientations.


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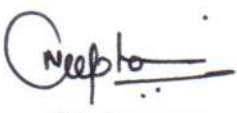
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BTME101	BEC	ENGINEERING DRAWING	60	20	20	30	20	1	0	4	3	

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5. Projection of geometrical planes with various orientations.
6. Projection of solid models with various orientations.
7. Projection of section of solids by using various types of cutting planes.
8. Drawing development of surface using various methods of prisms, pyramids, cone, cylinder, etc.
9. Drawing anti- development of surfaces.
10. Drawing isometric projections using various methods and isometric views.


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BTME103	BEC	WORKSHOP PRACTICES	0	0	0	30	20	0	0	2	1	

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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Course Educational Objectives (CEOs):

To paraphrases with (A) workshop technology, industrial safety, and understand material properties. (B) Carpentry shop, fitting shop, (C) welding and casting.

Course Outcomes:

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes:

1. Student would be able to understand the need of workshop, technology related to it, and industrial safety and precautions.
2. Student would be able to use carpentry tools, analyses various wood joints and their properties.
3. Students would be able to use fitting tools to make various shapes and design.
4. Student would be able to recognize various welding techniques and their needs.
5. Students would be able to design various shapes by using casting technologies.

Syllabus:

UNIT I

(6 Hrs)

Introduction to Workshop Technology & Industrial Safety:

Workshop Technology: Introduction, need of workshop and types of workshop

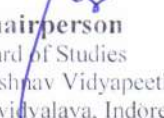
Industrial Safety- Introduction, objective of industrial safety, causes of accidents, common sources of accidents, preventive measures, and common safety methods.


UNIT II

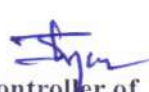
(6 Hrs)


Carpentry Shop:

Introduction, types of timbers, defects in timbers, timber prevention, characteristics of good timber, common tools used in carpentry shop (marking and measuring tools; cutting tools and striking tools), and common wood joints (cross-lap, corner-lap, dovetail and bridle joints).


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Choice Based Credit System (CBCS) Scheme in light of NEP-2020
B. Tech/B.Tech+MBA in Mechanical Engineering
(2023-2027)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME									
			THEORY			PRACTICAL			L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*					
BTME103	BEC	WORKSHOP PRACTICES	0	0	0	30	20	0	0	2	1	

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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UNIT III **(6 Hrs)**

Fitting Shop:

Introduction, tools used in fitting shop (measuring tools, holding tools, cutting tools, striking tools and supporting tools) and operation performed in fitting work.

UNIT IV **(6 Hrs)**

Welding Shop:

Introduction, terminological elements of welding process, welding joints (lap joints and butt weld joint), welding positions, advantages and disadvantages of welding, classification of welding, gas welding processes and safety recommendation for gas welding.

UNIT V **(6 Hrs)**

Casting:

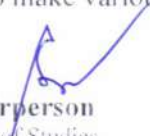
Pattern making and sand casting, Pattern materials, Types of pattern, Pattern allowances. Core prints. Moulding sand, ingredients, classification, sand additives, properties of moulding sand, sand preparation and testing. Green sand mould preparation. Cores and core making – Types of cores.

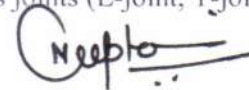
Text and Reference Books:


1. "Workshop Technology (Part-I)" by W.A.J. Chapman, CBS Pub, 2001.
2. "Production Technology (Vol-I)" by R.K. Jain, Khanna Publishers, 9th ed. 2019.
3. "Principles of Manufacturing Material & Process" by J.S. Campbell McGraw Hill, 1984.
4. "Welding: Principles & Practices" by Edward R. Bonhart, McGraw Hill Edu. India
5. "Welding and Welding Technology" by Richard L. Little, McGraw Hill, 2017.
6. "Principles of Foundry Technology" by P.L. Jain, McGraw Hill, 2017.
7. "Manufacturing Technology (Vol-I)" by P. N. Rao, McGraw Hill, 2017.
8. "Workshop Technology (Vol-I)" by B.S. Raghuvanshi, Dhanpat Rai & Co. 2015.

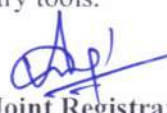
List of Experiments:

1. To study various industrial safety precautions & preventive measures.
2. To study the various timber properties, its defects and its prevention.
3. To make various joints (L-joint, T-joint, Cross joint, etc.) using carpentry tools.


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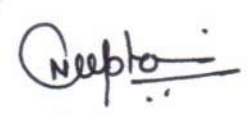
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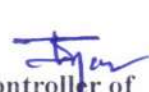
COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME103	BEC	WORKSHOP PRACTICES	0	0	0	30	20	0	0	2	1


Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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4. To perform various fitting shop operations using fitting tools.
5. To study various welding methods and its safety precaution.
6. To make various welding joints (Butt joints, Lap, joints, corner joints, etc).
7. To study various types of patterns and pattern allowances.
8. To study properties of moulding sand and prepare a mould.
9. To study various types of cores and its application in casting.


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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTTX 201	DCC	FUNDAMENTALS OF TEXTILE ENGINEERING	60	20	20	-	-	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit.

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. Develop comprehensive understanding of textile industry, its products, and its impact in a global scenario.
2. Develop comprehensive understanding in the area of textile technology, which includes fiber, yarn and fabric.
3. Develop the knowledge of different textile processes of the industries.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills, and attitudes. The students will be able to

1. Understand the fundamentals of textile fibre, its classifications, and general properties.
2. Understand yarn and fabric formation in textile industry.
3. Understand fabric to garment conversion process.
4. Understand coloration and finishing in textile industry.
5. Understand the concept of technical textiles, its classification and applications.

Syllabus

Unit I Introduction to Textile Fibres

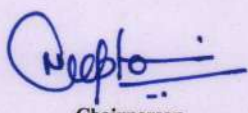
09 HRS

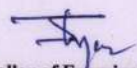
Overall view of the textile industries, Textile terminology, Classification of fibres, Identification of fibers, General properties of fibres (length, strength, flexibility, spin-ability, uniformity, density, luster, moisture and moisture regain, elasticity, elastic recovery, elongation, water repellent fibres, resiliency and Compressibility).

Unit II Introduction to Textile Mechanical Processing

09 HRS


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BTTX 201	DCC	FUNDAMENTALS OF TEXTILE ENGINEERING	60	20	20	-	-	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit.

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Staple fiber, Staple length, Introduction to the process of conversion of fibre to yarn, Types of yarns - spun yarn and filament yarn, Yarn count and yarn twist, Yarn numbering system, Novelty yarns.

Introduction to process of Conversion of yarn into fabric, Basic weaves and design, Knitted fabrics, Non-woven fabrics, Grey fabric inspection, Introduction to terry towels and sheeting.

Unit III Introduction to Garment Manufacturing Process

09 HRS

Introduction to Garment Technology, Process flow chart of garment manufacturing, Brief description of garment sampling, grading, marking, spreading, cutting, sewing, finishing and packing.

Unit IV Introduction to Textile Chemical Processing

09 HRS

Introduction to pretreatment process, Introduction to dyeing and printing, classification of dyes. Introduction to textile finishes, their object, and functions.

Unit V Introduction to Technical Textile

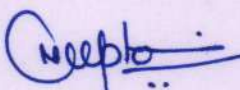
9 HRS

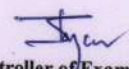
Introduction to technical textiles, General classification of technical textiles, Brief about Agro textile, geotextile, automobile textile, medical textiles, sport textiles, etc., Introduction to smart textile.

Textbooks:

1. Textile Science: An Explanation of Fibre Properties, Gohl, E. P. G., Vilensky, L. D., CBS Publisher, 1984.
2. Handbook of Technical Textiles, Edited by A. R. Horrocks and S. C. Anand, CRC Press, 2000.


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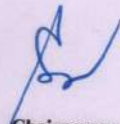
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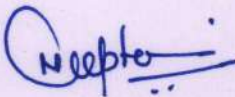
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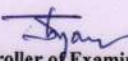
3. Knitting Technology by Spencer, Woodhead Publishing, Abington Hall, Abington, 2001.
4. Woven Fabric Production - I (1st Edition) by NCUTE Publication, 2002.
5. Fundamentals of Spun Yarn Technology by Lawrence Carl A. CRC press London, 2003.
6. Garment Technology for Fashion Design by Cooklin Gerry, Wiley-Blackwell; 2 edition, 2012.

Reference Books:

1. Principle of Weaving by Marks & Robinson, Textile Institute, 1976
2. Technology of Dyeing by Shennai, V. A., Sevak Publications, Wadala Mumbai, 1984
3. Scoring and Bleaching by Shennai, V. A. Sevak Publications, Wadala Mumbai, 1987.
4. A Practical Guide to Ring Spinning by Klein W, Textile Institute, 2000.
5. Weaving Machines, Mechanisms and Management by Talukdar M. K., Ajsaonkar D. B. and Sriramulu P. K. Mahajan Publishers Pvt. Ltd, 2004.


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